FACULTY OF PHARMACEUTICAL MEDICINE
OF THE ROYAL COLLEGES OF PHYSICIANS OF THE UNITED KINGDOM

DIPLOMA IN PHARMACEUTICAL MEDICINE

SYLLABUS FOR THE DIPLOMA IN PHARMACEUTICAL MEDICINE

INTRODUCTION

The syllabus for the Diploma in Pharmaceutical Medicine is composed of nine modules:

1. Medicines Regulation
2. Clinical Pharmacology
3. Statistics and Data Management
4. Clinical Development
5. Drug Safety
6. Healthcare Marketplace
7. Role of the Medical Department
8. Discovery of New Medicines
9. Therapeutics

The first six modules listed correspond to the advanced training modules for Pharmaceutical Medicine Specialty Training. In addition, ‘Discovery of New Medicines’ is considered an essential area of knowledge for physicians entering a career in pharmaceutical medicine. Similarly, ‘Therapeutics’ has always been included in the syllabus but its importance to the practice of all areas of pharmaceutical medicine is emphasised by its designation as a separate module.
The content of the syllabus is listed under the separate modules below. There is a considerable degree of overlap and some topics appear under more than one module though it is not intended to imply that any topic is restricted only to those modules under which it is listed. The order of listing does not reflect importance.

1. **MEDICINES REGULATION**

   - The general principles of medicines regulation
   - Medicines regulation in UK, EU, USA, Japan
   - Activities and contribution of International Conference on Harmonisation
   - Good Manufacturing Practices, Good Laboratory Practices, Good Clinical Practices
   - Clinical Trials regulations – IND, CTA, EU Directives etc
   - Common Technical Document, Overviews
   - Reporting of adverse drug reactions, periodic safety update reports
   - Product information – Summary of Product Characteristics, Patient Information Leaflets
   - Licensing – MAA, NDA, abridged applications, updating and maintaining licences
   - Orphan drugs
   - Provisions for and use of unlicensed medicines
   - Drug abuse and dependence
   - Non-prescription drugs and reclassification of Prescription Only and Pharmacy only medicines
   - Codes of practice, industry self regulation, advertising
   - Fraud and professional misconduct
   - Patents, legal issues, parallel imports
   - Ethics and Ethics Committees
   - Pharmacopoeias

2. **CLINICAL PHARMACOLOGY**

   **PRE-CLINICAL DEVELOPMENT TO SUPPORT TESTING IN HUMANS**

   - Safety testing – acute, subacute toxicology, genotoxicology, reproductive toxicology, topical irritation and hypersensitivity, safety pharmacology, immunotoxicology
   - Pharmacokinetics and metabolism
   - Pharmaceutical Development - formulations, manufacture and supply of materials, labelling and presentation, stability and storage, purity, compatibility, disposal

   **EXPLORATORY CLINICAL DEVELOPMENT**

   - Assessment of preclinical data
   - Planning of studies in Exploratory Development

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Populations for exploratory studies - healthy volunteers and patients
Ethics – principles, peer review, informed consent, Declaration of Helsinki
Regulation
Studies - objectives, design, conduct and analysis, choice of site
Tolerability and safety
Use of biomarkers and pharmacodynamic endpoints, dose-response
Pharmacokinetics, ADME and pharmacokinetic/pharmacodynamic models
Interpretation of study design, analysis and results

**CLINICAL PHARMACOKINETICS**
Concepts – half-life, volume of distribution, clearance
Bioavailability and bioequivalence
Drug-drug and drug-disease interactions (extrinsic factors)
Studies in different populations (intrinsic factors)
Pharmacogenetics
Population pharmacokinetics
Applicability of pharmacokinetics to dosage regimen and study design

3. **STATISTICS AND DATA MANAGEMENT**

*The purpose and fundamentals of statistics*

*Trial design, hypothesis testing, power*
Pre-trial decisions and specification
Risk factors, confounding variables
The null hypothesis, Type I and II errors, significance, power

*Measurement and types of data*
Standardisation
Variations in biometry in population, in disease

*Data collection and management*
Options for data collection (manual and electronic)
Creation, maintenance and security of databases, software validation and archiving
Data management from clinical trials: corrections, computer capture, verifications and extraction
Within-trial decisions, data management, extraction and manipulation

*Types of analysis*
Analysis of efficacy end-points and of safety
Paired and non-paired tests, parametric and non-parametric tests, confidence limits
Handling of rating and visual analogue scales, patient diaries and laboratory values
**INTERPRETATION OF STUDY DESIGN, ANALYSIS AND RESULTS**

Assessment of violations, withdrawals, errors, bias
Statistical principles and issues in report writing: data manipulation, transposition, merging
Clinical interpretation of trial
Final report writing and formatting for registration dossier and publications

4. **CLINICAL DEVELOPMENT**

**PLANNING AND ORGANISATION**

Organisation and operation of project teams
Objective and target setting
Integrated project planning
Requirements for licensing of new medicines
Budgeting and costs control

**REGULATION AND ETHICS**

EU Directives
ICH – Good Clinical Practices
Ethics – principles, peer review, informed consent, Declaration of Helsinki
Regulatory review
Indemnity
Confidentiality and data protection

**CLINICAL TRIALS**

Planning of clinical trial programme – use of preclinical and Phase I data
Study types and designs
Documentation - protocols, reports, source documents, case report forms, study master file, investigator's brochure
Contractual arrangements with investigators and contract research organisations
Study conduct
Quality control and quality assurance
Adverse Events and Serious Adverse Events – definitions, collection, reporting, assessment, coding
Interpretation of study design, analysis and results
Formulations, manufacture and supply of materials, labelling and presentation, stability and storage, purity, compatibility, disposal
Data management and statistical analysis

5. **DRUG SAFETY**

**PRECLINICAL**

*In vitro* and *in vivo* testing
Toxicology: dose-range finding, GLP studies, requirements to support exposure in humans, safety testing of topicals, immunotoxicity, genotoxicity, carcinogenicity, reproductive toxicity

Safety pharmacology
Studies of drug metabolism to predict interactions
Implications of findings to studies in humans

**Clinical Trials**
Adverse Events and Serious Adverse Events – definitions, collection, reporting, assessment, coding, ICH and CIOMS

**Adverse Drug Reactions**
Classification of Adverse Reactions, idiosyncrasy, accidents
Mechanisms, predisposing factors in health and disease
Dosage, accumulation, interactions
Assessment of evidence and management
Reporting
Carcinogenicity and genotoxicity
Prevention

**Regulation**
Dear doctor letters and withdrawal of products
SmPCs and PILs
Drug abuse and dependence
Non-therapeutic drug use
Life and storage safety of medicinal products

**Pharmacovigilance**
Methods and ethics of adverse event monitoring, post-marketing surveillance, spontaneous reporting, Post-authorisation safety studies of Marketed Medicines, Periodic Safety Update Reports
Benefit-risk assessment
Issue and crisis management

**Pharmacoepidemiology**
Databases
Signal generation
True and apparent incidence and prevalence data
Sensitivity and specificity of indices

6. **Healthcare Marketplace**
Quality of Life
Marketing structure and competition, price negotiations
National and local formularies
Product information, advertising and claims
Product support and promotion
Product life-cycle management
Product liability
Codes of practice including the MHRA Blue Guide
Principles and practice of marketing
Measurement of healthcare, governmental policy and third-party reimbursement
Principles of health economics
Pharmacoepidemiology
Competition, in-licensing, co-marketing

7. ROLE OF MEDICAL DEPARTMENT
   Clinical research
   Regulatory submissions
   Pharmacovigilance
   Quality assurance
   Information services
   Data management
   Financial control
   Legal compensation
   Crisis management

8. DISCOVERY OF NEW MEDICINES
   The philosophy behind and organisation of research
   Disease target identification and selection
   Patenting new active substances
   Receptor-based approaches, agonists, antagonists, enzyme inhibitors, genomics, proteomics
   Lead optimisation and candidate selection of molecules for exploratory human investigation
   *In vitro* and *in vivo* testing of new compounds
   Relationship between animal and human pharmacology

9. THERAPEUTICS
   Management of common acute and chronic diseases
   Major drug classes including biologics
   Measurement of drug effects
   Adverse drug reactions
   Benefit:risk
   Drug interactions
   Prescribing for particular populations e.g. children, elderly, pregnant and breast feeding women, patients with renal or hepatic impairment
   Controlled drugs and drug dependence
Overdosage and treatment of poisoning
Patient compliance and information
Therapeutic drug monitoring